



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

Address: COMMISSIONER FOR PATENTS

P.O. Box 1450

Alexandria, Virginia 22313-1450

www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/552,197	07/05/2006	Sungho Jin	15977-29	6489
28221 7590 01/05/2010 PATENT DOCKET ADMINISTRATOR LOWENSTEIN SANDLER PC 65 LIVINGSTON AVENUE ROSELAND, NJ 07068				
EXAMINER				
VAN, LUAN V				
ART UNIT		PAPER NUMBER		
1795				
MAIL DATE		DELIVERY MODE		
01/05/2010		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/552,197

Applicant(s)

JIN, SUNGHO

Examiner

LUAN V. VAN

Art Unit

1795

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 December 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/CD)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

Applicant's amendment of December 14, 2009 does not render the application allowable. Claims 1-9 are pending in the application.

Status of Objections and Rejections

All rejections from the previous office action are withdrawn in view of Applicant's amendment. New grounds of rejection under 35 U.S.C. 103(a) are necessitated by the amendments.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-9 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The limitation of "at least **partially** inserting the nanoscale electrode and the substrate substantially vertically into the electrolyte" is deemed to be new matter,

because the specification does not support that either the nanoscale electrode or the substrate is "partially" inserted into the electrolyte.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hunter et al. (US 5641391) in view of Yoshioka et al. (US pub 2002/0027080).

Regarding claim 1, Hunter et al. teaches a method of patterning a surface of a substrate comprising the steps of: providing the substrate 10 (Fig. 1) and at least one nanoscale electrode 11, wherein the substrate and the nanoscale electrode is oriented substantially perpendicular to each other (i.e., the nanoscale electrode is positioned at 90°, i.e., perpendicular, to the surface of the substrate, Fig. 1); covering at least a portion of the surface with an electrolyte 12; disposing at least one nanoscale electrode 11 in the electrolyte adjacent the surface; and applying a current between the electrode and the substrate to electrolytically deposit material on or remove material from the substrate surface (column 6 lines 55-58). The applicant, on page 4, lines 20-22 of the applicant's specification, defines nanoscale as a dimension less than 500 nm. Since the electrode of Hunter et al. has a tip diameter between 5-200,000 nm (column 5 lines 15-16), the electrode is a nanoscale electrode. A bath is inherently provided in Hunter et al. in order to contain the electrolyte.

Hunter et al. differs from the instant claims in that the reference does not explicitly teach whether the nanoscale electrode or the substrate is inserted vertically into the electrolyte. It is noted that the limitation of "at least partially inserting the nanoscale electrode and the substrate substantially vertically into the electrolyte" can be interpreted such that the substrate is inserted vertically but can be horizontally oriented.

However, it is well known to one having ordinary skill in the electroplating art to insert a substrate horizontally or vertically in an electrolyte. Yoshioka et al., for example, teaches that it is known to position a substrate such as a semiconductor wafer horizontally with the processing surface to be plated facedown and a plating liquid squirted from below, and that it is known to dip a substrate vertically in a plating tank and immerse in a plating liquid. According to the dipping method of electrolytic plating, bubbles that can adversely affect the quality of the plating are easily removed and the footprint is small. Further, the dipping method can be readily adapted to variations in wafer size (paragraph 8).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have inserted the nanoscale electrode and the substrate of Hunter et al. vertically into the electrolyte, as taught by Yoshioka et al., because it would facilitate removal of bubbles that can adversely affect the quality of the plating, and because the vertical inserting method can be adapted to variations in the substrate size as well as reduce the apparatus footprint (paragraph 8 and 10 of Yoshioka et al.).

Regarding claims 2 and 3, Hunter et al. teaches wherein the covering comprises immersing the substrate in an electrolyte bath (column 6 lines 61-64). Further

addressing claim 3, the examiner takes the position that immersing the substrate in the plating solution broadly reads on coating a layer of electrolyte to the surface.

Regarding claim 4, Hunter et al. teaches moving the electrode to write a pattern (column 5 lines 58-65).

Regarding claim 5, Hunter et al. teaches wherein the nanoscale electrode comprises a nanowire (column 5 lines 15-16).

Regarding claim 6, Hunter et al. teaches wherein at the least one nanoscale electrode comprises a plurality of nanowires or nanotubes disposed in a pattern or in a spaced-apart array (column 5 lines 23-26).

Regarding claim 7, Hunter et al. teaches wherein the substrate comprises metals, alloys, semiconductors or polymers (column 5 lines 12-14).

Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hunter et al. in view of Yoshioka et al., and further in view of Li et al. (US 6831017).

Hunter et al. and Yoshioka et al. teach the method as described above. In addition, Hunter et al. teaches that it is known to insulate the electrode (column 8 lines 4-21). However, Hunter et al. differs from the instant claims in that the reference does not explicitly teach embedding the plurality of nanowires in an insulating material.

Li et al. teaches forming a layer insulating material 20 (Fig. 2) on a plurality of nanowires 18 in order to electrically insulate the nanowires from each other, to provide additional structural support for the nanowires, and to seal all or at least a portion of the nanowires from the environment (column 6 lines 35-42).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have embedded the plurality of nanowires, as taught by Li et al., in the method of Hunter et al. and Yoshioka et al., because it would electrically insulate the nanowires from each other, to provide additional structural support for the nanowires, and to seal all or at least a portion of the nanowires from the environment (column 6 lines 35-42 of Li et al.).

Response to Arguments

Applicant's arguments filed have been fully considered but they are not persuasive. In the arguments presented on page 9 of the amendment, the applicant argues that Hunter et al. does not teach that the substrate and the nanoscale electrode are oriented substantially perpendicular to each other. The examiner respectfully disagrees. As clearly shown in Fig. 1 of Hunter et al., the nanoscale electrode is positioned at 90°, i.e., perpendicular, to the surface of the substrate.

The examiner agrees that Hunter et al. does not teach inserting the nanoscale electrode and the substrate substantially vertically into the electrolyte. Therefore, Yoshioka et al. is now relied on to teach this limitation.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP §

706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LUAN V. VAN whose telephone number is (571)272-8521. The examiner can normally be reached on M-F 9:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Nam X Nguyen/
Supervisory Patent Examiner, Art Unit 1753

LVV
December 29, 2009